



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/643,597

08/19/2003

Walter H. Whitlock

M02A454

3964

20411

7590

12/07/2007

THE BOC GROUP, INC.

575 MOUNTAIN AVENUE

MURRAY HILL, NJ 07974-2064

EXAMINER

EL ARINI, ZEINAB

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

12/07/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Application/Control Number:  
10/643,597  
Art Unit: 1792

Page 2



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents  
United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

**MAILED**  
**DEC 07 2007**  
**GROUP 1700**

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/643,597  
Filing Date: August 19, 2003  
Appellant(s): WHITLOCK, WALTER H.

\_\_\_\_\_  
David Hey  
For Appellant

**Supplemental EXAMINER'S ANSWER**

Application/Control Number:  
10/643,597  
Art Unit: 1792

Page 3

This is in response to the appeal brief filed 09/07/07 appealing from the Office action mailed 04/12/06.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**WITHDRAWN REJECTIONS**

Application/Control Number:  
10/643,597  
Art Unit: 1792

Page 4

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. The rejection under 35 U.S.C. 112, second paragraph, stated in paper No. 010606 has been withdrawn.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

US 2002/0112747	De YOUNG et al.	08-2002
6,612,818	NISHIO	09-2003
6,085,762	BARTON	07-2000
6,076,557	CARNEY	06-2000

***Specification***

The amendment to the specification, filed 05/02/06 is non-compliant amendment, because complete paragraphs including the amendment on pages 4 and 11 have not been provided.

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Application/Control Number:  
10/643,597  
Art Unit: 1792

Page 5

***Claim Rejections - 35 USC § 103***

1. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over De YOUNG et al. (US 2002/0112747) in view of Nishio (6,612,818), and as further evidenced by Carney (US 6,076,557).

De YOUNG et al. disclose a process and apparatus for cleaning a semiconductor wafer using dense phase carbon dioxide. Dense carbon dioxide is stored in a high-pressure vessel (I) (50) (at pressure between 300 and 5000 psi), the wafer is loaded into a cleaning chamber (III)(51). Cleaning chamber (III) is pressurized with clean carbon dioxide from either a bulk storage tank through valve (i)(55) or from pressure vessel (I)(50) through valve (a)(56) to a pressure of between 300 psi and 5000 psi. Highly filtered chemical adjuncts are added to the cleaning chamber from adjunct addition module (VI)(61) through valve (b)(62) during addition of dense CO<sub>2</sub> or alternatively prior to the addition of dense CO<sub>2</sub>. The reference discloses conveying a dense gas component and a liquid component to a vessel, applying an elevated pressure to said vessel, and contacting said component with the surface of the wafer. The reference discloses the dense component and the liquid component (isopropyl alcohol), the pressure, and the mixing steps as claimed. See paragraphs 40-41, 48-54 and 63, and Fig.4.

De YOUNG et al. do not teach using a bellows accumulator as claimed.

Application/Control Number:  
10/643,597  
Art Unit: 1792

Page 6

Nishio discloses a bellows type pump or accumulator for transporting chemical liquid in various processes such as washing surfaces of liquid crystal display devices in semiconductor producing apparatus. See col. 1, lines 14-46, and col. 2, lines 6-18.

Nishio also discloses at col. 3, line 3, "Fig. 15 is an operation diagram of the case where the fluid pressure in the bellows of the accumulator is raised", and also at col. 12, lines 36-40 "the compressed air is supplied into the air chamber 32 through the air supply port 39 to raise the filling pressure in the air chamber 32. In accordance with the rise of the filling pressure in the air chamber 32, the bellows 29 is contracted". Nishio does not teach the range of the pressure, but he discloses an automatic pressure adjusting mechanism of the accumulator (fig. 7), col. 6, lines 38-50.

It would have been obvious for one skilled in the art to use the accumulator taught by Nishio instead of the pressure vessel taught by De YOUNG et al. to obtain the claimed process and system, and to improve the cleaning process and to achieve the claimed invention and that there would have been a reasonable expectation of success. This is because both accumulator and pressure vessel used to elevate the pressure of the cleaning component. The Nishio' accumulator being capable of use at elevated pressure, because Nishio indicates that compressed air is used to elevate the pressures in the bellows and thus suggest that bellows accumulator can be used at elevated/higher pressure. As evidentiary teaching by Carney (6,076,557), where stated that "diaphragm type accumulators are typically suited only for relatively low pressure applications when constructed of metal and somewhat higher pressure applications (5000 psi) when constructed of rubber", see col. 1, line 66-col. 2, line 2, col. 2, lines 45-60, and col. 20, lines 9-19, see also col. 3, line 65- col. 4, line 11, it would be obvious for one skilled in the art to use the accumulator taught by Nishio instead of the pressure vessel taught by De YOUNG et al. to obtain the claimed process and system, and to improve the cleaning process.

Application/Control Number:  
10/643,597  
Art Unit: 1792

Page 7

It would have been obvious for one skilled in the art to adjust the flow rate to obtain the component velocity as claimed. This is because by increasing the pressure of the cleaning fluid, the flow rate of the cleaning fluid will increase, and therefore enhance the cleaning process.

2. Claims 1-2, 5, 8-19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton (6,085,762) in view of Nishio), and as further evidenced by Carney (US 6,076,557).

Barton discloses a process and system for cleaning a surface of a semiconductor wafer. The reference discloses conveying a component comprises a dense gas component, a liquid component, and a mixture thereof to a tank, applying an elevated pressure to said tank, contacting the component with a surface of semiconductor wafer. The reference discloses the dense gas, the mixing process, and the pressure as claimed. See col. 3, lines 39- 67, col. 4, lines 51-55, col. 5, lines 18-21, col. 7, lines 46-62, col. 8, lines 2-5, 11-20, 29-54, col. 12, lines 1-15, the claims and Fig. 1.

Barton does not teach the bellows accumulator as claimed.

Nishio as discussed supra discloses the bellows accumulator as claimed.

It would have been obvious for one skilled in the art to use the accumulator taught by Nishio instead of the ballast tank taught by Barton to obtain the claimed process and system, and to improve the cleaning process and to achieve the claimed invention and that there would have been a reasonable expectation of success. Simply alternating choice of tank because Barton discloses that to render the process as continuously

Application/Control Number:  
10/643,597  
Art Unit: 1792

Page 8

efficient as possible by providing a ready source of pressurized fluid at any time needs this. Furthermore, as evidentiary teaching by Carney (6,076,557), where stated that "diaphragm type accumulators are typically suited only for relatively low pressure applications when constructed of metal and somewhat higher pressure applications (5000 psi) when constructed of rubber", see col. 1, line 66-col. 2, line 2, col. 2, lines 45-60, and col. 20, lines 9-19, see also col. 3, line 65- col. 4, line 11, it would be obvious for one skilled in the art to use the accumulator taught by Nishio instead of the ballast tank taught by Barton to obtain the claimed process and system, and to improve the cleaning process.

#### **(10) Response to Argument**

Appellant's arguments filed 09/07/07 have been fully considered but they are not persuasive. Appellant's argument with respect to Nishio is a low pressure system, and the bellow type pump of Nishio is incapable of pumping fluid to high pressure is unpersuasive, because one skilled in the art would use pressure to discharge the liquid from the bellows towards the surface to be cleaned. The Nishio' accumulator being capable of use in high pressure, because Nishio indicates that compressed air is used to elevate the pressures in the bellows and thus suggest that bellows accumulator can be used at elevated/higher pressure. Furthermore, as evidentiary teaching, See Carney (6,076,557), where stated that "diaphragm type accumulators are typically suited only for relatively low pressure applications when constructed of metal and somewhat higher pressure applications (5000 psi) when constructed of rubber", see col. 1, line 66-col. 2,

Application/Control Number:  
10/643,597  
Art Unit: 1792

Page 9

line 2, col. 2, lines 45-60, and col. 20, lines 9-19, see also col. 3, line 65- col. 4, line 11.

Thus, it would have been clear to one of ordinary skill in the art that the bellows accumulator of Nishio would be capable and readily useful in high pressure systems and application, contrary to appellant's arguments.

It would have been obvious for one skilled in the art to adjust the pressure in Nishio by using pressure-regulating mechanism. See Nishio '818, col. 4, lines 5-14, col. 12, lines 22-50. This is also because the pressure as claimed (elevated pressure) could read on pressurizing the bellow to discharge the liquid toward the surface to be treated. This is also because all references are from the same technical endeavor, which is using densified (e.g liquid or supercritical) carbon dioxide cleaning composition for cleaning a surface of a substrate under pressure. With respect to appellant's argument that neither DeYoung et al. nor Nishio provide any guidance on the flow rate and the velocity at which cleaning mixtures are imparted to the wafer surface (claims 6 and 7), appellant's argument is unpersuasive, because it would have been obvious to a person having ordinary skill in the art at the time the invention was made to adjust the flow rate and the velocity, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 105 USPQ 223 (CCPA 1955).

With respect to appellant's argument about the use of two accumulators, appellant's argument is unpersuasive because it would have been an obvious matter of design choice to use two accumulators, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a

Application/Control Number:  
10/643,597  
Art Unit: 1792

Page 10

reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Zeinab EL-Arini


*Zeinab Elarini*

Conferees:

Michael Barr:

  
**MICHAEL BARR**  
SUPERVISORY PATENT EXAMINER

Roy King:

  
**ROY KING**  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700